EXHIBIT K

XI. DESCRIPTION OF THE PRIOR ART

35. The sections below provide a brief description of the asserted prior art.

A. Peeters - European Patent Application No. 0,753,948 (NOK00076059).

36. European Patent Application No. 0,753,948 titled "Capacity allocation for OFDM," with named inventors Johan Peeters, Paul Marie Pierre Spruyt and Jean-Francois Van Kerckhove ("Peeters") was filed on July 11, 1995.

37. An object of Peeters is "data element allocation and transmission for each type of data are thus tuned to its own specifications." Peeters at 2:26-28. Fig. 2 of Peeters provides a step-by-step approach to the allocation method.

> Referring to the flow chart and graphs of Fig. 2, a step by step approach of the complete service dependent allocation method performed by the mapping unit will be described now.
>
> The sequence of 9 steps and substeps in each of these 9 steps are shown in the flow chart covering the left part of Fig. 2, whilst the evolution of the data element distribution over the set of 11 carriers is drawn in the graphs attached to each step in the right part of Fig. 2.

Peeters 5:33-37.

38. Step 1 of Figure 2 is composed of three sub-steps.

- Sub-step 1 orders the carriers by decreasing sensitivity to noise. *See* Peeters at 6:14-22.
- Sub-step 2 assigns the data elements to a fast or interleaved group based on the type of data element. *See* Peeters at 6:23-32
- The third sub-step of Figure 2 divides the carriers. In fact, the only "methods" of assignment are "that the division in subsets might be based on a dummy rule assigning an equal number of carriers to each subset" or that "[m]ore intelligent implementations of the present

method however may use a subset composition already stored in an additional memory means, not shown in the drawings." Peeters at 6:38-40 and more generally *id.* at 6:33-41.

39. Importantly, there is no mention of SNR margin for this assignment and there is no common SNR margin used by all carriers in any subset defined in Peeters. At most, Peeters assigns the data elements to carriers based on whether the type of data requires impulse noise protection (*e.g.*, interleaved carriers) or requires little delay such as voice (*e.g.*, fast carriers). *See* Peeters at 5:38-44.

40. Step 4 describes a random allocation of data elements to the carriers within each subset. *See* Peeters at 6:42-50.

41. In Step 5, "data elements are removed to obtain new constellations without unoccupied carriers. To decide which data elements are removed, the 'required SNR per data element'-tables are consulted." Peeters at 6:52-53. Then subsequent to this, the SNR margin is calculated for each carrier. "These SNR margins are first calculated for each carrier in subset 1 by subtracting the requested SNR from the SNR value measured on each of these carriers." *Id.* at 6:59-7:2. *See also id.* at 6:51-7:10. There is no attempt to make all SNR margins used by all carriers in the subset the same. It is simply a calculated value.

42. Step 6 – The data element allocations are equalized by equalizing the SNR measurements, NOT the SNR margins. "In the sixth step, the data element allocations are equalised within each group. To perform this equalising the signal noise ratio (SNR) measurements . . . are again compared to the required signal noise ratio values stored in the 'required SNR per data element'-tables." Peeters at 7:11-13. Again, then subsequent to this, the SNR margin is calculated for each carrier. *Id.* at 7:11-25. Importantly, the goal of this reallocation is "to thereby maximize the minimum SNR margin within this group" (*id.* at 7:14-15), ***NOT*** to achieve a

common, equal SNR margin for all carriers within the group as required by claim 10 of the '354 Patent.

43. Step 7 removes 1-bit constellations and results in "[f]or each subset of carriers, an optimal data bit allocation is obtained now, i.e. an allocation is found with maximal minimum SNR margins." Peeters at 7:31-32 and generally *id.* at 7:26-34. The objective is to achieve the "maximal minimum SNR margins," ***NOT*** to achieve a common, equal SNR margin for all carriers within the group as required by claim 10 of the '354 Patent.

44. In Step 8, "[t]o obtain a data element distribution requiring the least overall power to be transmitted, overall equalization has to be performed." *See* Peeters at 7:35-36 and generally *id.* at 7:35-46. With respect to SNR margin, the overall minimum SNR margin is maximized. "With respect to optimised overall power transmission, ***the overall minimum SNR margin should be maximized*** since this results in a minimum overall power transmission. In step 8 it is therefore checked whether it is still possible to remove data elements from a carrier to a carrier of another subset thereby enlarging the minimum overall SNR margin." Peeters at 7:40-42 (emphasis added). The objective is to achieve the "maximal overall minimum SNR margin", ***NOT*** to achieve a common, equal SNR margin for all carriers within the group as required by claim 10 of the '354 Patent.

45. Step 9 allows mixed carriers to be formed with both interleaved and fast data elements if that will result in a configuration with larger SNR margins. *See* Peeters at 7:47-53. Again, the is no attempt to achieve a common, equal SNR margin for all carriers within the group as required by claim 10 of the '354 Patent.

46. In fact, as shown on all graphs on the right side of Figure 2, the distributions of carriers are shown with respect to the measured noise, "No." There is no indication that the "fast" group or the "interleaved" group has a common SNR

margin, and even if they each did have a common SNR margin, which they do not, there is no indication that the SNR margin within each group would be different as required by claim 10 of the '354 Patent.

47. Also, as described in Step 5, the requested SNR is each table of Figure 4 of Peeters is subtracted from the measured SNR value to obtain the SNR margins for each carrier. "For each carrier, the SNR margin is calculated. These SNR margins are first calculated for each carrier in subset 1 by subtracting the requested SNR from the SNR value measured on each of these carriers" Peeters at Col. 6:59-7:2. Based on this, the requested SNR cannot be the SNR margin, and the SNR margin is allowed to vary from carrier to carrier based on requested SNR and the measured SNR.

48. Mr. Lanning knows that the requested SNR is different from the SNR margin when he cites to Peeters at 6:59-7:10. Lanning Report at ¶164. Mr. Lanning confirms this again when he specifically cites to Peeters at 6:59-7:2, emphasizing both requested SNR and the measured SNR are used to calculate the SNR margin. ("These SNR margins are first calculated for each carrier in subset 1 by subtracting the **requested SNR** from the **SNR value measured** on each of these carriers."). Lanning Report at ¶179 (emphasis in the original). Yet, Mr. Lanning mistakenly states that "The 'Requested SNR (dB)' shown in the right-hand heading of each table is the 'SNR margin' as construed by the Court" contradicting the above cites. *Id.*

49. Even if the requested SNR were the SNR margin, which it is not, the requested SNRs are not the same for each carrier in the group.

B. Cai - U.S. Patent No. 6,205,410

50. U.S. Patent No. 6,205,410 titled "System and Method," issued to Lujing Cai ("Cai" or "Cai Patent"), on March 20, 2001, and was filed on October 13, 1998.

51. Cai discloses distributing serial data among multiple DMT channels without regard to the type of data. *See* Cai at Col. 3:50-61 and generally all of Cai. Cai further discloses determining an SNR margin to be applied to each carrier in order to determine "an optimum margin for each channel." *See* Cai Abstract and 1:65-67. Cai allows the SNR margins are allowed to vary from channel to channel, with no attempt to select channels to which to assign one common SNR margin versus assigning a different common SNR margin to another set of channels.

> Turning then, to FIG. 2, shown is a graph 60 which details the SNR of the channels of a DMT data link according to the present invention. Once again, for each DMT channel, a measured SNR 53 is shown. However, ***the SNR margins employed vary from channel to channel***, depending upon the potential SNR variation experienced during the connection. For example, a large margin 63 is used in channel 4, whereas a small margin 66 is used for channel 9. The varying margins allow the DMT channels to be used with a maximum of efficiency, while ensuring a low bit error rate.

Id. at Col. 3:4-14 (emphasis added).

52. Each individual channel has a margin calculated for it. *See* Cai at Col. 5:1-8. As shown in Figure 5 of Cai, each channel is processed individually, and the only consideration given to the margin is whether the overall margin γ_0 has stabilized. *See id.* at Col. 5:10-54.

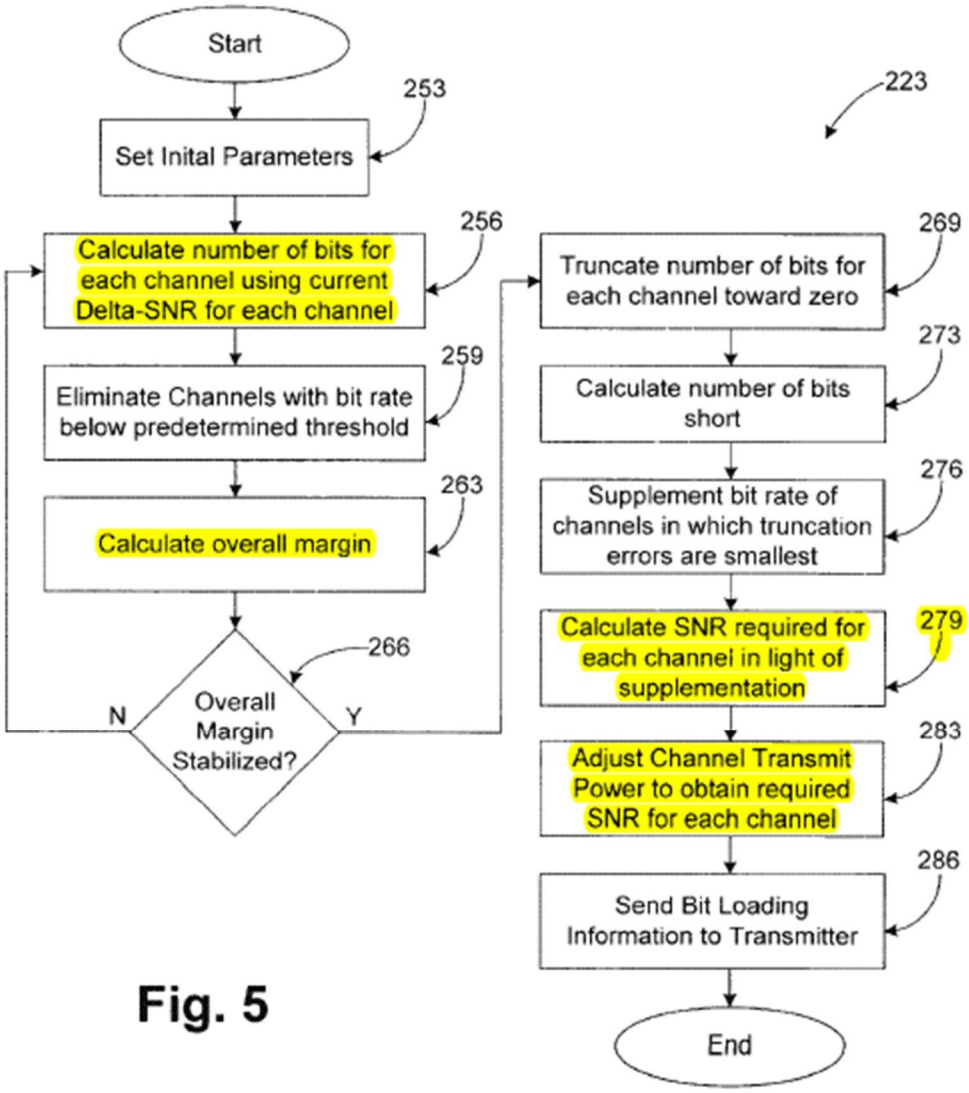

Fig. 5

Id. at Figure 5 (highlights added).

53. As shown above, Cai does not group the channels into pluralities of channels based on an SNR margin assigned or required, and Cai does not assign bits to a group of channels based on the bits requiring a particular SNR margin

> "As a result, the ***optimum margins are calculated for each DMT channel***, which in turn translates into an optimum bit rate for each DMT channel while ensuring a desired bit error rate which is, for example, 10^{-7}."

Cai at Col. 9:46-49 (emphasis added).

54. Mr. Lanning understands this as the goal of Cai when he states "Cai further describes a system and method which establishes an optimum margin for each channel in a discrete multi-tone DMT transceiver. *Id.* at Abstract." Lanning Report at ¶190 (italics in original). Mr. Lanning also understands that there is only one plurality of carriers over which bits are distributed.

> Cai describes a DMT multicarrier transceiver that modulates and demodulates a plurality of bits over a plurality of carriers. Cai at 1:12-13 ("this invention relates to the field of discrete multi-tone (DMT) data communication"), 1:19-22 ("In data communications using discrete multitone (DMT) technology, a serial data bit stream to be communicated is distributed among multiple channels and transmitted in parallel from a transmitting modem to a receiving modem.").

Id.

C. Kapoor – U.S. Patent No. 6,516,027

55. U.S. Patent No. 6,516,027, titled "Method and Apparatus For Discrete Multitone Communication Bit Allocation," issued to Samir Kapoor, et al. ("Kapoor" or "Kapoor Patent"), on February 4, 2003 and was filed on February 18, 1999.

56. Kapoor describes an apparatus and method that purportedly allocates bits to subchannels in a DMT system in a less complicated, less costly and more efficient manner.

> The present invention relates to data communications, specifically to an apparatus and method for allocating bits among carrier tone subchannels (bins) in a discrete multitone modulation (DMT) communication system. The present invention allows DMT communication to proceed at a data rate via communication equipment which is less complicated, less costly, and more efficient than prior DMT communication devices.

Kapoor at Col. 1:7-14.

receiving portion of the transceiver, determined a SNR margin for each subchannel and assigned the number of bits to be used on each subchannel based on this SNR margin, as discussed above. Thus, claim 10 lacks enablement." Lanning Report at ¶132.

103. Contrary to Mr. Lanning's opinion, the written description of the of the '354 Patent would enable a POSITA to practice claim 10. Mr. Lanning repeats his previous erroneous argument from his written description opinion that the receiver must be determining the SNR margin as opposed to the proper plain meaning of the claim term that the first/second plurality of bits were received by the first/second plurality of carriers using a first/second SNR margin.

XIII. VALIDITY ANALYSIS WITH REGARD TO ANTICIPATION OR OBVIOUSNESS

104. Mr. Lanning opines that claim 10 of the '354 Patent is invalid under five different grounds with respect to anticipation or invalidity: 1) Peeters, 2) Cai in view of Peeters, 3) Kapoor in view of Peeters, 4) Chow and 5) Kapoor in view of Chow. *See* Lanning Report at Sections XII.A.1 through XII.A.5. As shown below, each of these opinions is incorrect.

105. The Lanning Report identified five separate prior art invalidity grounds. I understand that the Court ordered the Defendants to "serve a Final Election of Asserted Prior Art, which shall identify no more than six asserted prior art references per patent from among the twelve prior art references previously identified for that particular patent and no more than a total of 20 references. For purposes of this Final Election of Asserted Prior Art, each obviousness combination counts as a separate prior art reference." Doc. 128. To comply with the Court's order, Defendants have elected the following prior art references for Family 10: EP 0753948A1 to Peeters et al. in view of U.S. Patent No. 6,205,410 to Cai EP 0753948A1 to Peeters et al. in

view of U.S. Patent No. 6,516,027 to Kapoor et al, Chow and Kapoor in view of Chow. Defendants no longer contend that Claim 10 of the '354 Patent is disclosed in view of Peeters alone. However, Defendants rely on Peeters for other elected obviousness combinations. Accordingly, I have analyzed Peeters separately and I incorporate this analysis in my opinions regarding the other elected obviousness combinations that rely on Peeters.

106. As set forth below, none of the asserted prior art combinations disclose a first and second plurality of carriers where a respective first and second SNR margin are used to determine the bit allocations for the first and second plurality of carriers, respectively.

A. Peeters Does Not Disclose the Elements of Claim 10

107. It is my opinion that Peeters does not teach, disclose or suggest claim 10 of the '354 Patent. The sections below detail my claim element-by-claim element analysis. I have used Mr. Lanning's claim element designations for clarity within this report.[3]

1. 10.Preamble – A multicarrier communications transceiver operable to:

108. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.Preamble of the '354 Patent.

109. For the reasons set forth below, Peeters does not disclose a transceiver configured to perform the functional limitations recited in the body of the claims.

110. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.Preamble of the '354 Patent.

[3] Dr. Lanning has split claim element 10[a] into two parts: 10.a – "receive a multicarrier symbol comprising a first plurality of carriers, and 10.b - and a second plurality of carriers. Therefore, his claim element labeling will differ from mine by a single letter after his claim element 10.a. For example, his claim element 10.c corresponds to my claim element 10[b] that I used in the Brody Infringement Reports and in Section VIII above.

2. 10.b – receive a multicarrier symbol comprising . . . a second plurality of carriers

111. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.b of the '354 Patent.

112. With regard to "multicarrier symbol comprising a first plurality of carriers and a second plurality of carriers," Mr. Lanning only addresses the "first plurality of carriers" in Peeters. *See* Lanning Report at ¶¶147-153. With respect to the "second plurality of carriers," Mr. Lanning never addresses the multicarrier symbol in his analysis of claim element 10.b in either Peeters. *See* Lanning Report at ¶¶154-159.

113. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.b of the '354 Patent.

3. 10.c – receive a first plurality of bits on the first plurality of carriers using a first SNR margin

114. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.c of the '354 Patent.

115. Peeters calculates the SNR margin for each carrier and does not limit the resulting SNR margin values to any particular value (*i.e.*, a first SNR margin). *See* Peeters at 3:30-34 ("This signal noise ratio margin therefor has to be calculated for each carrier by subtracting from the signal noise ratio value measured for this carrier, the required signal noise ratio value to enable allocating data elements thereto."). The calculated SNR margins can be any value and can all be different. In addition, there is no disclosure that a single, common SNR margin used by a group of carriers when performing bit allocation. Based on this, Peeters does not disclose receiving a first plurality of bits on the first plurality of carriers using a first SNR margin.

In an implementation of this waterfilling principle, data

> elements can be allocated one by one to the carrier having the largest signal noise ratio margin. This signal noise ratio margin therefor has to be calculated for each carrier by subtracting from the signal noise ratio value measured for this carrier, the required signal noise ratio value to enable allocating data elements thereto.

Peeters at 3:30-34.

116. Even if two carriers within a group happened to have the same SNR margin, that does not satisfy this claim element, because in Peeters "a parameter [is not] used in determining the number of bits allocated to each of a plurality of carriers," as required by the claim element. Further, Peeters does not meet claim element 10.c because as described in the '354 Patent, before allocating the bits the margins are set (*see* Fig. 2, Step 160). The margins are determined based on environmental fluctuations ('354 Patent at Co. 7:14-24), noise measured during idle times (*id.* at Col. 7:25-34) or predetermined from known impairments (*id.* at Col. 7:35-42). The margins are stored before they are assigned to carriers and then bits are allocated to the carriers. *See* Steps 120, 160 and 170 of Figure 2.

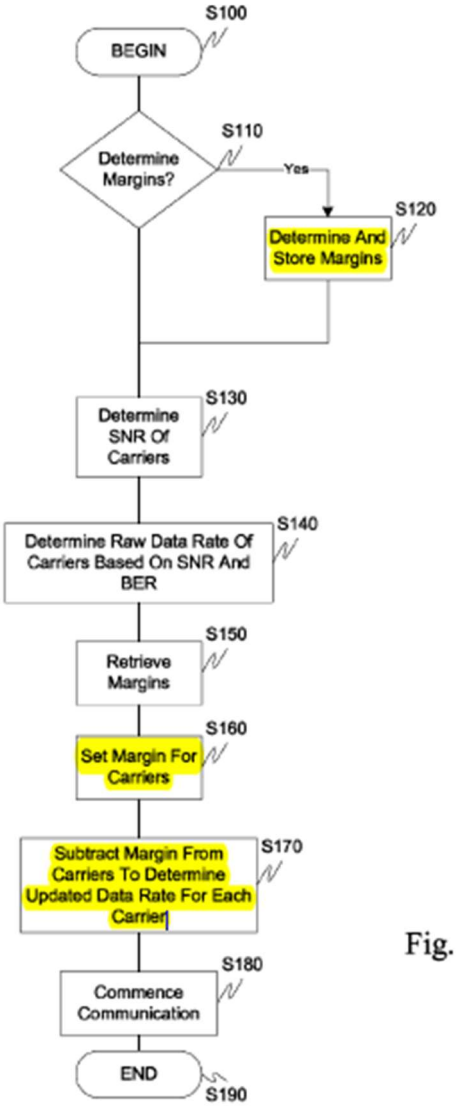

Fig. 2

'354 Patent, Figure 2 (highlights added).

117. To the contrary, with regard to Peeters, Mr. Lanning notes that the SNR margins are calculated as needed. "Peeters describes performing the calculations for each carrier using the measured SNR and the SNR margin" (Lanning Report at ¶164) and that these "***SNR margins are first calculated for each carrier in subset 1*** by subtracting the requested SNR from the SNR value measured on each of these carriers." (Peeters at 6:59-72 (emphasis added) and generally *id*. at 6:59-7:10).

Notably, the second citation above shows that the carriers are already grouped into subsets before the SNR margins are even calculated. Therefore, even though Peeters says "As a result, the SNR margin for f1 equals 2 dB. The SNR margins similarly calculated for f2, f10, f3, f9 and f8 are equal to 0 dB, -1 dB, 7 dB, -1 dB and 2 dB respectively" (Peeters at 7:3-6), the matching SNR margin of -1 dB on carriers f10 and f9, while in the same group, were not used to assign the carriers to that group.

118. Mr. Lanning also notes that Peeters further discloses that "an allocation is found with maximal minimum SNR margins" by moving data elements from carriers with a lower SNR margin to carriers with a higher SNR margin. *See* Lanning Report at ¶166. This, however, at most changes some of the SNR margins within a subset, but does not result in a subset of carriers using the same SNR margin or the use of the SNR margins to assign any of those carriers to the subset.

119. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.c of the '354 Patent.

4. 10.d – wherein the first plurality of carriers is different than the second plurality of carriers

120. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.d of the '354 Patent.

121. Mr. Lanning uses the same arguments and response for claim element 10.d as for his claim element 10.c.

> "As discussed above for element 10.c, incorporated herein, Peters discloses receiving a second plurality of carriers defined as subset 2 and subset 2 has a second plurality of bits based on the SNR margins for subset 2."

Lanning Report at ¶171.

122. Therefore, my arguments to Lanning's analysis 10.c apply and it is my opinion that Peeters does not disclose claim element 10.d of the '354 Patent.

5. 10.e – wherein the first plurality of carriers is different than the second plurality of carriers

123. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.e of the '354 Patent.

124. As the antecedents from claim elements 10.c and 10.d require a common first SNR margin used by the first plurality of carriers and a common second SNR margin used by the second plurality of carriers respectively, there is no first plurality of carriers using a first SNR margin, and there is no second plurality of carriers using a second SNR margin. Consequently, Peeters does not have a first plurality of carriers that is different than the second plurality of carriers.

125. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.e of the '354 Patent

6. 10.f – wherein the first SNR margin is different than the second SNR margin

126. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.f of the '354 Patent.

127. In referring to annotated Figures 4 and 5 of Peeters, Mr. Lanning states "The 'Requested SNR (dB)' shown in the right-hand heading of each table is the 'SNR margin' as construed by the Court" and "Figure 5, also shown below, shows the measured SNR values." Lanning Report at ¶179. Mr. Lanning is incorrect in both cases. Mr. Lanning even cites Peeters (Peeters at 6:59-7:2) where Peeters discloses that the calculated SNR margins are derived from the requested SNR.

Number of bits allocated	Requested SNR (dB)
1	16
2	16
3	20
4	23
5	25

Subset 1

Number of bits allocated	Requested SNR (dB)
1	15
2	15
3	21
4	24
5	27

Subset 2

Fig. 4

"These SNR margins are first calculated for each carrier in subset 1 by subtracting the ***requested SNR from the SNR value measured*** on each of these carriers." *Id.* (emphasis in the original).

Id. at ¶180.

128. Mr. Lanning, then assumes that the Requested SNR values of Subset 1

Carrier	Measured SNR (dB)
f11	17
f1	22
f2	16
f10	22
f3	23
f9	19
f8	22
f4	23
f7	26
f6	26
f5	18

Fig. 5

are the first SNR margins and then assumes that the Requested SNR values of Subset 2 are the second SNR margins (as contraindicated by Peeters at 6:59-7:2), incorrectly concluding:

> The table on the left lists five different values for the "first SNR margin." *Id.* at Fig. 4. The table on the right lists 5 different values for the "second SNR margin." *Id.* A comparison of the values listed for the first and second SNR margins shows that all the values listed for the first SNR margin are different than all the values listed for the second SNR margin. *Id*. Specifically, Subset 2 does not include the values 16, 20, 23 or 25. *Id.*

Lanning Report at ¶179 (italics in the original).

129. Mr. Lanning makes clear that he does not think that the SNR margin for a plurality of carriers needs to be the same for each carrier, even while this would be the plain and ordinary meaning to a POSITA. In order to cover the correct plain

and ordinary meaning, Mr. Lanning states that "if the Court determines that the SNR margin for the first plurality of carriers needs to be the same value and the SNR margin for the second plurality of carriers also needs to be the same value but different[sic] a different value than the first SNR," then "the first plurality of carriers would have a SNR margin of 16 and the second plurality of carriers would have a SNR margin of 15." Lanning Report at ¶180.

130. Again, Mr. Lanning is incorrect. The tables in annotated Figure 4 above are bit allocation tables. The tables do not show the SNR margin for any particular carrier. The tables in annotated Figure 5 above only show the measured SNR per carrier, not the SNR margin of any carrier.

131. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.f of the '354 Patent.

7. 10.g – and wherein the first SNR margin provides more robust reception than the second SNR margin.

132. It is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.g of the '354 Patent.

133. Mr. Lanning argues that the carriers are split into two subsets stating "the carriers in subset 1 are assigned to channels with 'a high sensitivity for burst errors' and the carriers in subset 2 are assigned 'to carriers which are less sensitive for burst errors' (less robust)." Lanning Report at ¶183. Nowhere does Mr. Lanning explain why carriers with higher or lower sensitivity to burst errors would have a higher or lower SNR margin, why the SNR margin for the carriers that are interleaved or the carriers that are fast would have a common SNR margin, or why the common SNR margins for each group would be different.

134. Peeters teaches that the carriers f1…. f11 are "arranged in decreasing order of noise sensitivity." Peeters at 6:35. The carriers are then divided into two

subgroups where "the division in subsets might be based on a dummy rule assigning an equal number of carriers to each subset." *Id*. at 6:40. Alternatively, the subgroups may be created based on the number of data elements that are interleaved versus not interleaved, *i.e.*, fast path. Importantly, the division is not based on two different common SNR margins.

135. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.g of the '354 Patent.

B. Cai in View of Peeters Does Not Invalidate Claim 10

136. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim 10 of the '354 Patent. The sections below detail my claim element-by-claim element analysis.

1. No Motivation to Combine Cai in view of Peeters

137. Cai and Peeters have very different approaches to allocating bits to carriers and none of the approaches perform the bit allocation using a first SNR margin and second SNR margin for a respective first and second plurality of carrier signals. Cai treats all data bits the same way and discloses calculating an optimum margin independently for each carrier. *Supra* §XI.B and Cai at Fig. 5. Peeters discloses a very different methodology where the data elements are assigned as interleaved data or fast data, carriers are then divided into the two subsets, and then the data elements are randomly distributed to carriers within each subset. *Supra* §XI.A and Peeters at 6:23-41. Peeters does not disclose using a first and second SNR margin for the respective interleaved carriers and fast data carriers, respectively. In order for Cai to use Peeters' methodology, Cai would have to change its method of operation from treating all bits the same and allowing the SNR margin for each carrier to vary, to classifying bits as of a certain type and dividing carriers into subsets to best handle the bit types.

138. Mr. Lanning also states that "[o]ne of ordinary skill in the art would have understood that the carriers in Cai's DMT system ***could*** be divided into subsets of carriers where each subset would have the same SNR margin." Lanning Report at ¶197 (emphasis added). First, by using the word "could," Mr. Lanning admits that Cai does not disclose dividing into subsets of carriers where each subset would have the same SNR margin. Second, Cai treats all bits the same way. Third, as discussed above, Peeters does not disclose dividing carriers into subsets with the same SNR margin, and fourth, does not disclose treating bits differently. *Supra* §XI.A. Consequently, a POSITA would not have a reasonable expectation of success in combining the two references.

139. Finally, even if a POSITA combined the references as proposed, the resulting combination would not result in the claimed invention. Mr. Lanning asserts that "a person of ordinary skill in the art would have had reasonable expectations of success in combining the teachings of Peeters' with Cai's technique of optimizing the SNR margin on each carrier." Lanning Report at ¶197. As an initial matter, I have been informed that whether a POSITA would have had a reasonable expectation of success in making the combination is the incorrect standard. The relevant standard is whether there is a reasonable expectation of success at arriving at the claimed invention. Because neither reference discloses or suggests two plurality of carriers that use two respective SNR margins to perform bit allocation, the resulting combination cannot result in the claimed invention. Accordingly even if a POSITA would be motivated to combine aspects of the references, there would not have been a reasonable expectation of success at arriving at the claimed invention and Mr. Lanning doesn't so assert.

2. 10.Preamble – A multicarrier communications transceiver operable to:

140. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.Preamble of the '354 Patent.

141. For the reasons set forth below, Cai in view of Peeters does not disclose a transceiver configured to perform the functional limitations recited in the body of the claims.

142. Based on the above, it is my opinion that Peeters does not teach, disclose or suggest claim limitation 10.Preamble of the '354 Patent.

143. Based on the above, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.Preamble of the '354 Patent.

3. 10.b – receive a multicarrier symbol comprising . . . a second plurality of carriers

144. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.b of the '354 Patent.

145. With regard to "multicarrier symbol comprising a first plurality of carriers and a second plurality of carriers," Mr. Lanning only addresses the "first plurality of carriers" in Peeters. *See* Lanning Report at ¶¶147-153 and 206. With respect to the "second plurality of carriers," Mr. Lanning never addresses the multicarrier symbol in his analysis of claim element 10.b in either Cai or Peeters. *See* Lanning Report at ¶¶154-159 and 208-212.

146. Mr. Lanning also begins addressing claim elements 10.c and, 10.d and 10.f in this section. Therefore, I provide analysis of his opinions as they relate to those claim elements in this section.

147. In Paragraph 210 of his report, Mr. Lanning points to his annotated version of Figure 2 of Cai and he states:

> A person of ordinary skill in the art would have understood

> that Cai discloses a first plurality of carriers having the same SNR margin that is different than a second plurality of carriers having a different SNR margin. For instance, a person of ordinary skill in the art would have understood that Cai discloses a system wherein channels, or at least carriers 6 and 13 of Figure 2 comprise a first plurality of carriers having the same SNR margin, and channels, or at least carriers 7 and 10, comprise a second plurality of carriers having the same SNR margin as shown in the annotated Figure 2 below.

Lanning Report at ¶210.

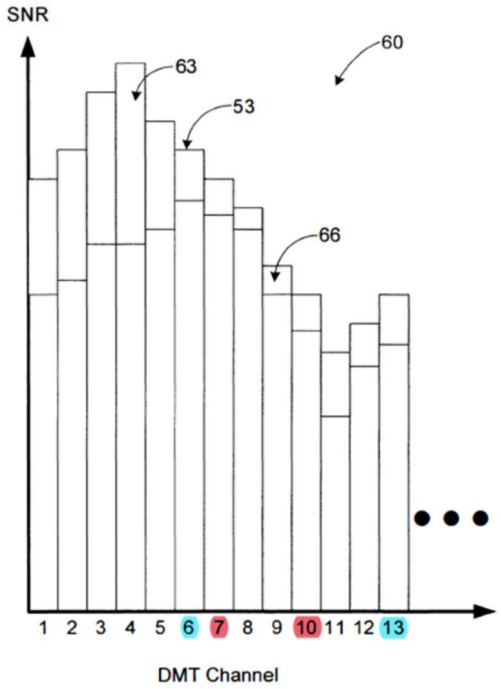

Fig. 2

Id.

148. Mr. Lanning is incorrect. First, the system does not divide the carriers into two pluralities. As Figure 2 shows, Cai treats each carrier individually.

149. Second, the system does not choose a group of carriers and then use an SNR margin for each carrier in the group. As Cai states "However, the SNR margins employed vary from channel to channel, depending upon the potential SNR variation

experienced during the connection." Cai at Col. 3:7-9 and the description of Figure 2 in general at Col. 3:4-13. Cai does not disclose a group of carriers using the same SNR margin nor the assigning of the same common SNR margin to all carriers in a plurality.

150. In Paragraph 212, Mr. Lanning states that Peeters "discloses that subsets of carrier groups can be grouped together and assigned certain data" and "[a] person of ordinary skill in the art would have understood that Peeters' method can be applied in Cai's DMT system to allocate a first and a second group of data elements." I disagree. As discussed above, this would require Cai to change its method of operation and the POSITA would not have a reasonable expectation of success of combining the two references to arrive at the claimed invention, which mitigates against a POSITA's motivation to combine Cai with Peeters. *Supra* §XIII.B.1.

151. Even if Cai were combined with Peeters, as discussed above, Peeters may divide carriers into different groups but as is required in claim elements 10.c and 10.d, does not do so to apply the same common SNR margin to each so that each carrier in the group can use the same common SNR margin. *Supra* §§XIII.A.3 and XIII.A.4. At most, Cai in view of Peeters results in two different groups of carriers, with different SNR margins calculated for each carrier and with no attempt to assign the same common SNR margin to each carrier in the group. *Supra* §XI.B and *see* Cai at Col. 3:4-13.

152. I further note with regard to "multicarrier symbol comprising a first plurality of carriers and a second plurality of carriers," Mr. Lanning only addresses the "first plurality of carriers" in Peeters. *See* Lanning Report at ¶206. With respect to the "second plurality of carriers," Mr. Lanning never addresses the multicarrier

symbol in his analysis of claim element 10.b in either Cai or Peeters. *See* Lanning Report at ¶¶208-212.

153. Based on the above, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.b of the '354 Patent.

4. 10.c – receive a first plurality of bits on the first plurality of carriers using a first SNR margin

154. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.c of the '354 Patent.

155. The Court construed "SNR margin" as "*a parameter* used in determining the number of bits allocated *to each of a plurality of carriers*, where the value of the parameter specifies an extra SNR requirement assigned per carrier in addition to the SNR required to maintain a specified bit error rate (BER) for the communication link at a specified bit allocation." For the reasons set forth below, Cai does not disclose the claimed SNR margin as construed by the Court.

156. Mr. Lanning admits that the SNR margins in Cai are calculated independently for each channel and vary from channel to channel. "As a result of the SNR logic, the 'optimum margins are calculated for each DMT channel, which in turn translates into an optimum bit rate for each DMT channel while ensuring a desired bit error rate which is, for example, 10^{-7}.' *Id.* at 4:45-48." and "The SNR margins vary from channel to channel. *Id.* at 3:7-8." Lanning Report at ¶¶215-216 (italics in the original). Thus, in Cai optimum SNR margins are calculated for each DMT channel in the plurality of channels to achieve the desired BER at a specified bit allocation. Cai does not calculate and use *an* SNR margin for a plurality of carriers to maintain a specified BER at a specified bit allocation. Consequently, Cai does not disclose "a parameter used in determining the number of bits assigned" to the first plurality of carriers.

157. As Cai does not disclose the required SNR margin on the first plurality of carriers, Mr. Lanning must rely on the understanding of a POSITA. Specifically, Mr. Lanning asserts that:

> A person of ordinary skill in the art would have understood that the system of Cai describes bit allocation wherein a first plurality of carriers will have a first SNR margin and receive a first plurality of bits based on the SNR logic. For example, channels 6 and 13, as the first plurality of carriers, would be assigned the first plurality of bits based on their SNR margin.

Lanning Report at ¶217.

158. Mr. Lanning's opinions are commensurate neither with the scope of the claims nor the disclosure of Cai. As previously explained Cai calculates an optimum margin for each carrier; Cai does not "describe[] bit allocation wherein a first plurality of carriers will have a first SNR margin." Additionally, assigning two channels the first plurality of bits based on their SNR margin, as taught by Cai, is not assigning two channels the first plurality of bits based on *a* first SNR margin. Accordingly, Cai does not inherently disclose this claim limitation.

159. As Cai does not meet this claim element, Mr. Lanning attempts to also rely on Peeters. "As discussed above in § XII.A.1.f, and incorporated herein, Peeters also discloses claim 10.c." Lanning Report at ¶219. I disagree. As discussed above, Peeters also does not disclose claim element 10.c. *Supra* §XIII.A.3. Mr. Lanning again resorts to an unmotivated POSITA by stating:

> "A person of ordinary skill in the art would have understood that the carriers in Cai ***could*** be grouped into subsets by the techniques of Peeters, and then the technique in Cai ***could*** be applied to optimize the SNR margins for each plurality of carriers."

Lanning Report at ¶219 (emphasis added).

160. Even if the POSITA ***could*** do it, the result would still be at most be two different groups of carriers, with different SNR margins calculated for each carrier and the first carrier plurality not using the same common SNR margin for each carrier in the first plurality.

161. Based on the above and my comments in Section XIII.A.2, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.c of the '354 Patent.

5. 10.d – receive a second plurality of bits on the second plurality of carriers using a second SNR margin

162. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.d of the '354 Patent.

163. Mr. Lanning repeats Paragraphs 214 through 216 in the Lanning Report in Paragraphs 221 through 223. In Paragraph 224, Mr. Lanning uses the same arguments as in Paragraph 217 of the Lanning Report. As Cai does not disclose the required SNR margin on the second plurality of carriers, Mr. Lanning must rely on the POSITA to distribute SNR margins in channels 7 and 10 to the remaining carriers in the second plurality without providing any motivation for doing so. *See* Lanning Report at ¶224.

164. As Cai does not meet this claim element, Mr. Lanning attempts to also rely on Peeters. "As discussed above in § XII.A.1.f, and incorporated herein, Peeters also discloses claim 10.d." Lanning Report at ¶219. I disagree. As discussed above, Peeters also does not disclose claim element 10.d. *Supra* §XIII.A.4. Mr. Lanning again resorts to an unmotivated POSITA by stating:

> "A person of ordinary skill in the art would have understood that the carriers in Cai ***could*** be grouped into subsets by the techniques of Peeters, and then the technique in Cai ***could*** be applied to optimize the SNR margins for each plurality of carriers."

Lanning Report at ¶226 (emphasis added).

165. Even if the POSITA ***could*** do it, the result would still be at most two different groups of carriers, with different SNR margins calculated for each carrier and the second carrier plurality not using the same common SNR margin for each carrier in the second plurality.

166. Based on the above and my comments in Section XIII.A.2, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.d of the '354 Patent.

6. 10.e – wherein the first plurality of carriers is different than the second plurality of carriers

167. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.e of the '354 Patent.

168. As an initial matter, as the antecedents from claim elements 10.c and 10.d require a common first SNR margin used by the first plurality of carriers and a common second SNR margin used by the second plurality of carriers, there is no first plurality of carriers using a first common SNR margin, and there is no second plurality of carriers using a common second SNR margin. Consequently, both Cai and Peeters do not have a first plurality of carriers that is different than the second plurality of carriers.

169. Mr. Lanning also states "As shown above in annotated Figure 2, the first plurality of carriers ***could be*** channels 6 and 13 and the second plurality of carriers could be channels 7 and 10. Thus, channels 6 and 13 are different than channels 7 and 10." Lanning Report at ¶228 (emphasis added). As he does in his analysis of claim elements 10.c and 10.d, Mr. Lanning relies on the SNR margins for carriers 6 and 13, and carriers 7 and 10, to derive two different pluralities of carriers. The use of the term "could be" by Mr. Lanning shows that the matching of

the SNR margins is unmotivated. Moreover, in Figure 2 and its associated text, Cai considers each carrier individually as part of a single group.

170. Mr. Lanning further states "As a result of channels having different SNR margins, it is inherent that the system of Cai discloses a first plurality of carriers that is different than a second plurality of carriers." Lanning Report at ¶231. Again, Mr. Lanning relies on the SNR margins of carriers 6 and 13, and carriers 7 and 10, within a single plurality (all the carriers of Cai), as opposed to the plurality of carriers using a common single SNR margin for all carriers within a first plurality of carriers and using another common SNR margin for all carriers within a second plurality of carriers. Further, stating that the disclosure is inherent is incorrect because Cai only discloses a single plurality of carriers. *Supra* §§XIII.B.4 and XIII.B.5.

171. In Paragraph 233 of his report, Mr. Lanning states "A person of ordinary skill in the art would have understood that the plurality of carriers in Cai that have the same SNR margin would be assigned the same bits during bit allocation, and therefore, would comprise a first plurality of carriers with bit allocations that are different than the second plurality of carriers." I disagree. As discussed above, Cai discloses only a single plurality of carriers. Further, as suggested by Mr. Lanning, should the POSITA apply the disclosures of Peeters, the POSITA would then not end up with pluralities of carriers using the same common SNR margin. *Supra* §§XIII.B.4 and XIII.B.5.

172. Based on the above, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.e of the '354 Patent.

7. 10.f – wherein the first SNR margin is different than the second SNR margin

173. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.f of the '354 Patent.

174. In his analysis, Mr. Lanning asserts that "Cai is directed toward a system where SNR margins vary from channel to channel. *Id.* at 3:7-8," Lanning Report at ¶236 (italics in the original). SNR margins that vary from channel to channel are not the same as a "first plurality of carriers using a first SNR margin" and a "second plurality of carriers using a second SNR margin." As discussed above (*supra* §§XIII.B.4 and XIII.B.5), the plurality of carriers in Cai does not use an SNR margin, (*i.e.*, "a parameter used in determining the number of bits allocated to each of a plurality of carriers" nor a second common SNR margin. In fact, Cai does not identify a first plurality and a second plurality of carriers. Given that Cai does not have pluralities of carriers that use a first SNR margin nor a second SNR margin, Cai does not disclose this claim element.

175. With respect to Peeters, Mr. Lanning relies on his arguments in the Lanning Report §XII.A.1.i, that Peeters discloses this claim element. As discussed above, Peeters also not disclose this element. *Supra* §XIII.A.6.

176. Based on the above, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.f of the '354 Patent.

8. 10.g – wherein the first SNR margin provides more robust reception than the second SNR margin

177. It is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.g of the '354 Patent.

178. With regard to Cai, Mr. Lanning relies on the POSITA, stating "A person of ordinary skill in the art would have understood that a channel (or plurality of carriers) which provide a higher margin provides more robust reception than a channel (or plurality of carriers) with a lower SNR margin." Lanning Report at ¶242. Mr. Lanning also relies on the different SNR margins to define the first common SNR margin and the second common SNR margin as well as the first/second

pluralities of carriers. *See* Lanning Report at ¶243. As there is no first or second SNR margin (*supra* §§XIII.B.4 and XIII.B.5), there cannot be a first SNR margin that provides more robust reception than the second SNR margin.

179. With respect to Peeters, Mr. Lanning relies on his arguments in the Lanning Report §XII.A.1.j, that Peeters discloses this claim element. As discussed above, Peeters also not disclose this element. *Supra* §XIII.A.7.

180. Based on the above, it is my opinion that Cai in view of Peeters does not teach, disclose or suggest claim limitation 10.g of the '354 Patent.

C. Kapoor in View of Peeters Does Not Invalidate Claim 10

181. It is my opinion that Kapoor in view of Peeters does not teach, disclose or suggest claim 10 of the '354 Patent. The sections below detail my claim element-by-claim element analysis.

1. No Motivation to Combine Kapoor in view of Peeters

182. Mr. Lanning states that:

> A person having ordinary skill in the art would thus have been motivated to add the method of Peeters to the communication devices of Kapoor, and would have found it trivial to do so. More specifically, Kapoor describes reducing the measured SNR of each subchannel by the difference between the margin and the coding gain (i.e., by the quantity γ_margin-γ_coding), and then determining the bit allocation and gain scaling values using the resulting reduced measured SNR values. See, e.g., Kapoor at 7:43-10:46. Based on the teachings of Peeters, a person having ordinary skill in the art would have been motivated to use Peeters' method of grouping subsets of carriers together and assigning certain data to the respective subsets of carriers. See e.g., Peeters at 3:16-24. A skilled artisan would have found this modification trivial, particularly because Kapoor discloses that different margins can be used for different subchannels, and Peeters discloses allocating data elements to different sets of carriers.

Lanning Report at ¶255.